$$S^{(k)} = s^{(k)}$$

s_1 s_k

the Allies' captured
sample of German tanks

two statements of conditional probability:

$$\pi(N = n \mid S^{(k)} = s^{(k)}) = \frac{\pi[(S^{(k)} = s^{(k)}) \cap (N = n)]}{\pi(S^{(k)} = s^{(k)})}$$

$$\pi(S^{(k)} = s^{(k)} \mid N = n) = \frac{\pi[(S^{(k)} = s^{(k)}) \cap (N = n)]}{\pi(N = n)}$$

$$(S^{(k)} = s^{(k)}) \cap (N = n)$$

Germany's tank
arsenal in 1942

$$N = n$$

Euler diagram

Bayes' theorem

likelihood   prior

$$\underbrace{\pi(N = n \mid S^{(k)} = s^{(k)})}_{\text{posterior}} = \frac{\overbrace{\pi(S^{(k)} = s^{(k)} \mid N = n)}\ \overbrace{\pi(N = n)}}{\underbrace{\pi(S^{(k)} = s^{(k)})}_{\text{evidence}}}$$